Biological Evaluation for the Approval of Maryland Department of the Environment Water Quality Standards by EPA Region III under Clean Water Act Section 303(c)(3)

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Federal Action:

The Federal action being evaluated is the Environmental Protection Agency's (EPA) approval of new or revised sections of the Water Quality Standards adopted by the Maryland Department of the Environment on March 23, 2012. Only those parts of the regulations that are new or revised are considered as part of this evaluation.

Regulatory Background on Maryland Water Quality Standards:

On January 13, 2012, the Maryland Department of the Environment (MDE) published in the Maryland Register 39(1) page 69 the Notice of Proposed Action to amend the Code of Maryland Regulation (COMAR). The proposed amendments, codified in COMAR 26.08.02 Water Quality Criteria, amended section .03-3C Criteria for Use II Waters, resulting in changes in dissolved oxygen criteria in two Chesapeake Bay segment: addition of restoration variance for one segment, and modification of restoration variance for another segment. MDE held a public information meeting concerning the adoption of these amendments at their main office on January 26, 2012. Maryland informed EPA on March 8, 2012, that the State would provide notice on March 23, 2012 in the Maryland Register of the adoption of these amendments.

Action Area:

The area evaluated for action is the state of Maryland. Waters of the state are defined in Maryland water quality standards COMAR Section 26.08.02.O1B(103) as, "(a) Both surface and underground waters within the boundaries of this State subject to its jurisdiction, including that part of the Atlantic Ocean within the boundaries of this State, the Chesapeake Bay and its tributaries, and all ponds, lakes, rivers, streams, tidal and nontidal wetlands, public ditches, tax ditches, and public drainage systems within this State, other than those designed and used to collect, convey, or dispose of sanitary sewage; (b) The flood plain of free-flowing waters determined by the Department of Natural Resources on the Basis of the 100-year flood frequency." Only two tidal segments of the Chesapeake Bay are covered by this action: Eastern Bay Mesohaline (EASMH) and Lower Chester River Mesohaline (CHSMH).

List of Federally Listed Species Which May be Found Within the Action Area:

The attached list and Appendix B includes all threatened and endangered species compiled by the Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) for the State of Maryland. The species listed include plants, mollusks, fishes, reptiles, birds, insects, and mammals. The level of information for each species varies. Only a limited number of threatened or endangered species are aquatic organisms. Because this action covers only two tidal segment of the Chesapeake Bay, this evaluation will consider the aquatically dependent species that still occur in these two tidal segments in Maryland and may be affected by this action.

Plants: Small whorled Pogonia, Canby's Dropwort, Swamp Pink, Harperella, Sandplain geradia, Northeastern Bulrush, Sensitive Joint Vetch, Pigweed Seabeach, American Chaffseed, Smooth Coneflower.
Mammals: Delmarva Fox Squirrel, Indiana Bat, humpback whale, finback whale, blue whale, right

whale, Sei whale, sperm whale.
Birds: Piping Plover, Red-cockaded woodpecker.
Fish: Shortnose Sturgeon, Atlantic Sturgeon
Reptiles: Bog Turtle, Loggerhead Sea Turtle, Kemp's Ridley Sea Turtle, Leatherback Sea Turtle, Green Sea Turtle.
Mollusks: Dwarf Wedge Mussel
Arthropods: Puritan Tiger Beetle, Northeastern Beach Tiger Beetle, Hay's Spring Amphipod, American Burying Beetle

Plants:

None within action area

Mammals

Various marine mammals such as the blue whale (Balaenoptera musculus), sei whale (Balaenoptera borealis), sperm whale (Physeter catodon), right whale (Balaena glacialis), humpback whale (Megaptera novaeangliae) and finback whale (Balaenoptera physalus) occur in ocean waters off the coast of Maryland (NOAA National Marine Fisheries Service 1991a, 1991b, 1998b, 1998c). There is some evidence that healthy whales occasionally use bay waters. For example, in 1994, two humpback whales were reported lunge fishing under the Chesapeake Bay Bridge, according to Dr. Cindy Driscoll, DVM, Maryland Department of Natural Resources (C. Driscoll, personal communication, 1995). As noted in the NMFS 2012 BO for 2010 Chesapeake Bay TMDL:

> *The Chesapeake Bay is not a high use area for whales. Transient individual right and humpback whales may occasionally be present in the lower Bay for brief periods during annual migrations or during the summer months, but no whales are known to be resident in this area and even transient whales are considered rare in the lower Bay. As whales are air breathers, their distribution is not impacted by dissolved oxygen levels and dissolved oxygen levels will not affect their behavior or physiology. Additionally, while there is the potential for water quality conditions in the Bay to affect species that whales feed on, since no whales are expected to feed in the action area, any effects to potential whale prey items is extremely unlikely to affect any whales. Because any effects to whales are extremely unlikely to occur, all effects to whales are discountable. As such, NMFS has determined that the proposed action is not likely to adversely affect right or humpback whales. Right and humpback whales will not be considered further in this Opinion.* (NOAA NMFS, 2012)

Birds:

None within action area.

Fish:

Shortnose sturgeon

The shortnose sturgeon (Acipenser brevirostrum) is a Federally listed species. Shortnose sturgeon was listed as endangered on March 11, 1967 (32 FR 4001), and they remained on the endangered species list with the enactment of the Endangered Species Act in 1973 (NOAA National Marine Fisheries Service 1998a, 2002). The National Oceanic and Atmospheric Administration's National

Marine Fisheries Service Shortnose Sturgeon Recovery Plan (Recovery Plan) indicates reports of its occurrence in the Chesapeake system in 1876 (NOAA National Marine Fisheries Service 1998a). The National Marine Fisheries Service Biological Opinion for the Washington Aqueduct Permit (NOAA National Marine Fisheries Service 2002) mentions other historical records that report occurrence of shortnose sturgeon in the Chesapeake Bay in the following locations: the Potomac River (Smith and Bean 1899), the upper Chesapeake Bay near the mouth of the Susquehanna River in the early 1980s, and the lower Bay. The EPA believes there is a potential that the Dadswell et. al. 1984 referenced observations at the mouths of the James and Rappahannock are incorrect. The authors misidentify the York (as the James) on the map presented in Figure 7 and give two markings, represented by dots in very up-estuary regions (one in York, one in the Mattaponi). No details were given on the number of observations or source. An additional 15 observations were noted near the mouths of the James and Rappahannock rivers in the late 1970s (Dadswell et al. 1984). The U.S. Fish and Wildlife Service Reward Program for Atlantic Sturgeon began in 1996. Shortnose sturgeon have been incidentally captured via this program. As of July 2002, 50 shortnose sturgeon were captured via the reward program in the Chesapeake Bay and its tributaries–four from the lower Susquehanna River, two in the Bohemia River, six in the Potomac River, two south of the Bay Bridge near Kent Island, one near Howell Point, one just north of Hoopers Island, one in the Elk River, and two in Fishing Bay (Mangold 2003; Spells 2003; Skjeveland et. al. 2000). The remaining 31 shortnose sturgeon were captured in the upper Chesapeake Bay north of Hart-Miller Island. These fish were captured alive in either commercial gillnets, poundnets, fykenets, eel pots, hoop nets, or catfish traps (Mangold 2003; Spells 2003; Skjeveland et. al. 2000). In many river systems, shortnose sturgeon appear to spend most of their life in their natal river systems, only occasionally entering higher salinity environments. They are benthic omnivores and continuously feed on benthic and epibenthic invertebrates including molluscs, crustaceans and oligochaete worms (Dadswell 1979). Shortnose sturgeon depend on free-flowing rivers and seasonal floods to provide suitable spawning habitat. For shortnose sturgeon, spawning grounds have been found to consist mainly of gravel or ruble substrate in regions of fast flow. Flowing water provides oxygen, allows for the dispersal of eggs, and assists in excluding predators. Seasonal floods scour substrates free of sand and silt, which might suffocate eggs (Beamesderfer and Far 1997). Shortnose sturgeon spawn in upper, freshwater sections of rivers and feed and overwinter in both fresh and saline habitats. In populations that have free access to the total length of a river (absent of dams), spawning areas are located at the farthest accessible upstream reach of the river, often just below the fall line (NOAA National Marine Fisheries Service 1998a). According to the Recovery Plan, shortnose sturgeon are affected by habitat degradation or loss (resulting, for example, from dams, bridge construction, channel dredging, and pollutant discharges) and mortality (resulting, for example, from impingement on cooling water intake screens, dredging and incidental capture in other fisheries) as principal threats to the species' survival (NOAA National Marine Fisheries Service 1998a). The recovery goal of the Plan is to delist shortnose sturgeon populations throughout their range, and the recovery objective is to ensure that a minimum population size sufficient to maintain genetic diversity and avoid extinction.

Atlantic sturgeon

The Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus) is a federally listed species. Atlantic sturgeon was listed as endangered on February 6, 2012 (77 FR 5880) and, for the purpose of this action, specifically the Chesapeake Bay Distinct Population Segment (DPS). With this being a recent listing, a recovery plan has yet to be developed. Although no Recovery Plan has been drawn up, there is a wealth of information regarding the Atlantic sturgeon. The Atlantic sturgeon has been known to be stressed for quite some time with its first identification as candidate species for listing

under the ESA in 1991. After a 1997 petition from the Biodiversity Legal Foundation, the Service revisited the subject and decided that enough information was available to warrant an action (62 FR 54018). In 1998, the Service determined that listing was not warranted at that time (63 FR 50187). In the same year the Atlantic States Marine Fisheries Commission (ASMFC) imposed a 20 – 40 year moratorium on all Atlantic sturgeon. Following that action, in 1999, the Service closed the Exclusive Economic Zone (EEZ) to Atlantic sturgeon retention. In 2003, the Services convened a workshop to discuss the status of this species and obstacles that were impeding their recovery. One outcome of that workshop was a second review of Atlantic sturgeon status by the Atlantic Sturgeon status review team (ASSRT). The ASSRT published a report in 2007. In 2009, the National Resources Defense Council (NRDC) petitioned the Service to list the species as endangered under ESA. As a result of the information provided by the AART report, the NRDC petition, and other new information, the Service determined that the Atlantic sturgeon qualifies as species under ESA and, for the purpose of this action, specifically the Chesapeake Bay DPS.

The Atlantic sturgeon is an anadromous fish which spend most of its life in brackish or salt water and migrates to freshwater to spawn. Spawning adults migrate in the April-May time frame from the mid-Atlantic to flowing waters between the salt front and fall line of large rivers. These spawning adults remain in river until fall, at which time they migrate back to the Atlantic. The hatched youth remain in their natal waters up to five or six years before migrating to the ocean. Once they reach open water, Atlantic sturgeon resides close to shore. They are long living fish which may live up to 60 years.

Historically, Atlantic sturgeon were once very plentiful in the Chesapeake Bay with an estimated 20,000 female adults present before sturgeon fishery began in 1890s (Secor 2002). Historical harvests were reported in the Patuxent, Potomac, Choptank, Nanticoke, and Wicomico/Pocomoke rivers in Maryland. This harvesting for both caviar and meat grew exponentially in the late 1800 with record landing in 1890 where over 3350 metric tons (mt) of Atlantic sturgeon were landed from coastal rivers along the Atlantic Coast. By 1901, the fishery collapsed when less than 10% (295 mt) of its 1890 peak landings were reported. The fisheries never recovered with harvest remaining at 1-5% of the historic peak. The Atlantic sturgeon fishery was closed by ASMFC in 1998, when a coastwide fishing moratorium was imposed for 20-40 years, or at least until 20 year classes of mature female Atlantic sturgeon were present (ASMFC 1998A).

There are many factors which play a role in affecting the ability of the Atlantic sturgeon to recover in the twentieth century and beyond. With this fishery closed, direct harvest in no longer a factor. However, bycatch does exert a pressure on the population. Since Atlantic sturgeon spend a portion of their lives in rivers, estuaries, the nearshore ocean, and the EEZ, they are subject to incidental capture at greater rates than nonanadromous species. Interestingly enough, bycatch also allows for scientific studies to be done on populations and dispersal and growth of yearling Atlantic Sturgeon in Chesapeake Bay (Secor, et al, 2000). As part of this study, both Maryland and Virginia initiated an award program for Chesapeake Bay fishermen for the capture and holding of live juvenile Atlantic sturgeon.

Among the many variables affecting habitat or range are dams and turbines, dredging and blasting, and water quality. There are no dams in Maryland Chesapeake Bay tributaries which are below historic spawning reaches. Dredging activities which potentially could occur in Maryland Chesapeake Bay tributaries could destroy habitat suitable for spawning and smother eggs with spoils. Chesapeake Bay sturgeon need clean, hard substrate for attachment of demersal, adhesive eggs (Bushnoe et al. 2005). Rubble, cobble, and gravel size rock, as well as shell, forest litter, and

submerged vegetation provide substrate for egg attachment, all which can be destroyed or smothered during dredging operations. It is also possible for Atlantic sturgeon to be killed during the actual dredging activity.

Water quality, especially low dissolved oxygen levels, would appear to be a limiting factor. Dissolved oxygen in the hypoxia range of 2-3 mg/L along with higher temperature could result in low survival rate (Secor, 1998). Atlantic surgeon will come to the surface to take in oxygen rich water thus mitigating hypoxic bottom water conditions. However, eggs and juveniles will not be able to escape the effect of hypoxia conditions in sturgeon nursery areas. It has been postulated that not only has increased incidences of summertime hypoxia degraded sturgeon nursery habitats in Chesapeake Bay but that the spawning populations of Atlantic surgeon may have been extirpated from Chesapeake Bay (Speir and O'Connell, 1996). This prognosis appears to be tempered by other studies and information. In a dispersal and growth study (Secor, et al, 2000), juvenile Atlantic Sturgeon were released in the Nanticoke River. The released fish were tracked via the Maryland and Virginia award program. Not only were the juvenile Atlantic sturgeon captured over a wide range of the Chesapeake Bay, they also showed an annual growth rate between 0.64 and 0.83%. This indicates that the Chesapeake Bay supports juvenile habitat. Virginia reward program also captured some juvenile fish in the York and James River which were not part of that dispersal study. Captures of YOY and age-1 sturgeon in the James River during 1996 and 1997 suggest spawning has occurred in that system. Large Atlantic sturgeon (victims of boat strikes) have been recovered in the James River. Most recently (September 2011) a biologist from Virginia Commonwealth University captured a female Atlantic sturgeon leaking eggs near the confluence of the Appomattox and James River. (Chesapeake Bay Journal, October 2011).

Reptiles:

Marine sea turtles which are known to frequent this action area include the Northwest Atlantic DPS of loggerhead (Caretta caretta), Kemp's ridley (Lepidochelys kempi), leatherback (Dermochelys coriacea) and green (Chelonia mydas). Sea turtles are migratory; they enter the Chesapeake Bay in late May to early April when water temperatures rise and depart between late September and late November. Estimates derived from aerial surveys in the 1980s indicated that an estimated 3,000 to 10,000 loggerhead turtles and an estimated 500 Kemp's ridley sea turtles use the Chesapeake Bay each summer; estimates of the number of green sea turtles in the Bay were not available. In the 2001-2004 period, mean abundances of sea turtles in the entire Bay were between 2,850 and 5,479 turtles (Mansfield 2006). Approximately 95 percent of the loggerheads found in the Chesapeake Bay are juveniles, and the area from the mouth of the Bay to the Potomac River serves as an important foraging area for this life stage. Loggerhead sea turtles tend to forage along channel edges in the Bay and tidal rivers while Kemp's ridley sea turtles feed in the water flats. Sea turtles in the Chesapeake Bay (mostly loggerheads and Kemp's ridleys) forage on crustaceans (e.g., crabs) and mollusks. Threats to the turtles include, incidental takes, poaching, pollution and marine habitat degradation. Recovery plans include protection of nesting habitats, eliminating mortality from incidental catch in commercial fishing, and reduction of marine pollution (NOAA National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991a, 1991b, 1992, 1993; U.S. Fish and Wildlife Service and NOAA National Marine Fisheries\Service 1992). As noted in the NMFS 2012 BO for 2010 Chesapeake Bay TMDL:

> *As all sea turtles are air breathers, dissolved oxygen levels do not directly affect their physiology or behavior. However, dissolved oxygen levels may affect the prey base for these species and may therefore affect the foraging behavior of these turtles. Sea turtles are*

expected to occur in the Chesapeake Bay primarily in the warmer summer months (generally, May – October) and their main activity at this time is foraging. Sea turtles enter the Bay as early as April 1 with the majority entering the Bay in May when water temperatures rise and depart between late September and early November. The area from the mouth of the Bay to the Potomac River serves as an important foraging area for juvenile loggerheads. Loggerhead sea turtles tend to forage along channel edges and tidal rivers while Kemp's ridley feed in the water flats. As the dissolved oxygen criteria have been designed to be protective of shellfish (open-water shellfish use and deep-water shellfish use), it is reasonably certain that the dissolved oxygen levels will be adequate so that there is no decrease in the prey base for these turtles (Kemp's ridley and loggerhead). The dissolved oxygen criteria have also been designed to be protective of the shallow water bay grasses that green turtles are expected to consume. Therefore, there is not expected to be any decrease in the availability of forage for green turtles.

While there is no designated use that is designed to be protective of jellyfish, jellyfish are known to be tolerant of extremely low dissolved oxygen levels (Condon et al. 2001; Purcell et al. 2001) and the dissolved oxygen levels set by the Regional Guidance Criteria document are expected to be protective of jellyfish, which are the preferred prey of leatherback turtles. As sea turtles, even if exposed to anoxic conditions, would not experience any negative physiological or behavioral effects, there is no means for any cause of injury or mortality due to dissolved oxygen conditions in the action area. As such, no injury or mortality is expected to occur.

Once the water quality criteria are achieved, sea turtle prey will be adequately protected and there are not likely to be any negative impacts to sea turtles. In the interim period, there could be reduced sea turtle prey as compared to future conditions when the water quality criteria are attained and as compared to historic conditions. But, reductions in prey relative to the current environmental baseline are not anticipated. However, as EPA's existing water quality programs related to attaining the criteria have been implemented the prey base for sea turtles has increased and is likely to continue to increase during the interim period. For example, in 2009, underwater bay grasses covered 9,039 more acres of the Bay's shallow waters than in 2008, for a total of 85,899 acres; also in 2009, the health of the Bay's bottom dwelling species reach a record high of 56 percent of the goal, improving by approximately 15% Bay-wide; additionally, in 2009 the adult blue crab population increased to 223 million, its highest level since 1993 (Chesapeake Bay Program 2010). If the distribution of sea turtle prey is affected by dissolved oxygen levels then the distribution of sea turtles in the Bay could also be affected. However, any effects to individuals will be minor and temporary and limited to small alterations in movements related to foraging behavior. Individual sea turtles are not expected to have to expend significant amounts of additional energy or to need additional resources to compensate for the distribution of prey species within the Bay. As such, all effects to individuals are likely to be insignificant and discountable and there are not anticipated to be any population level impacts(NOAA NMFS, 2012.)

Mollusks:

None within action area

Arthropods:

None within action area

ESA Effects Analysis on Modification of Maryland's COMAR Title 26.08

Description of Maryland's Water Quality Standards:

Maryland's water quality standards are set forth in Code of Maryland Regulations (COMAR) Sections 26.08.02.01 - 26.08.02.09. The standards are adopted and implemented to maintain and protect the waters of the state. This would provide protection for the noted aquatic dependent listed species. The standards are based on federal criteria, regulation, and guidance.

On January 12, 2012, Maryland notified EPA of its intention to adopt revisions to its water quality standards in a Notice of Proposed Action. These amended regulations are under COMAR Section 26.08.02.03-3 Water Quality Criteria Specific to Designated Uses and are considered major modifications. Appendix A provides a summary of the three revisions adopted by Maryland and EPA's likely action. Only the approval of those parts of the regulations that are new or revised is considered in this evaluation.

Manner in Which the Action May Affect Listed Species:

Details of the revisions on which EPA would be taking action can be found in Appendix A to this document. EPA is making the finding that our approval of those revisions may affect, but is not likely to adversely affect, the two species of concern and their critical habitat. EPA views these revisions as not affecting the conservation and protection of endangered and/or threatened species living in the aquatic environment and their habitats in this action area of Maryland.

Note that in April 2003, EPA issued the "Biological Evaluation for the Issuance of Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll *a* for the Chesapeake Bay and Its Tidal Tributaries." The purpose of that document was to determine the impacts on threatened and endangered species from EPA's issuance of *Regional Criteria Guidance* (*Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and Its Tidal Tributaries*. EPA 903-R-03-002) to address nutrient overenrichment in the Chesapeake Bay. That evaluation determined that the only endangered or threatened species in the Chesapeake Bay watershed that would potentially be affected is the shortnose sturgeon. The evaluation further found that the water clarity and chlorophyll *a* criteria would not likely adversely affect, and would indeed beneficially affect listed species in the Bay.

NOAA Fisheries responded with a Biological Opinion dated April 19, 2004, which addressed all threatened and endangered species under NOAA Fisheries jurisdiction, but focused on the effects of the dissolved oxygen criteria on endangered shortnose sturgeon. It was NOAA Fisheries' biological opinion that the issuance of the Chesapeake Bay criteria by EPA may adversely affect the population of endangered shortnose sturgeon through displacement to suboptimal habitat or other behavioral and metabolic responses to hypoxic conditions but is not likely to jeopardize the continued existence of the Chesapeake Bay population of shortnose sturgeon or the species as a whole.

Due to a number of addenda to the *Regional Criteria Guidance*, and the recent proposal of an EPA

issued Total Maximum Daily Load (TMDL) to address nutrient overenrichment for the Chesapeake Bay, EPA revisited its 2003 Biological Evaluation. On November 3, 2010, EPA issued an addendum to that Biological Evaluation, focused on shortnose sturgeon and dissolved oxygen. In 2012 NOAA NMFS issued a Biological Opinion of this 2010 Chesapeake Bay TMDL and discussed the potential effect of this TMDL on aquatic species known to frequent the Chesapeake Bay. Because the 2010 addendum to the 2003 Biological Evaluation and the subsequent 2012 NOAA NMFS Opinion already addressed the impact to the shortnose sturgeon of a limited restoration variance such as those in the revisions that Maryland has now adopted, (see 2012 NOAA NMFS, p. 105).it will not be further addressed here. We still will address the impact to other threatened and endangered, including the Atlantic sturgeon, which was listed as an endangered species on February 6, 2012.

COMAR 26.08.02.03-3C Criteria for Use II Waters – Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting

MDE adopted a new dissolved oxygen seasonal deep-channel refuge subcategory 2% restoration variance for the Eastern Bay Mesohaline (EASMH) section and modified the dissolved oxygen restoration variance for the Lower Chester River Mesohaline (CHSMH) section from 14% to 16% spatial and temporal (in combination). The impact of these revisions to shortnose sturgeon is addressed in EPA's November 3, 2010 addendum to its 2003 Biological Evaluation. For Atlantic sturgeon, EPA finds that our approval of these revisions will have no effect on this endangered species in the state. This finding is based on the fact that these variances (new and revised) cover a small percentage of the total Maryland Deep-Water Seasonal Fish and Shellfish and Deep Channel Seasonal Refuge which in turn makes up a small part of the total acreage available which will allow Atlantic sturgeon ample alternative habitat with acceptable dissolved oxygen levels.

EPA has documented that the original basis for establishing the CHSMH variance is the limited response of dissolved oxygen concentrations to reduced nutrient loads in the lower Chester River deep-channel, combined with the physical characteristics of the narrow, deep channel in this region indicate a natural constraint on the re-oxygenation of the lower mixed layer by either deep riverine flows or deep estuarine flows from the adjacent mainstem Bay. EPA has documented that the bathymetry of the lower Chester River provides a physical barrier to complete re-oxygenation of the deepest region of the lower Chester River even under extremely high nutrient reductions. A narrow deep channel transects the center of the lower Chester River, and exchange of oxygenated deep waters between the mainstem Chesapeake Bay and this deep hole is restricted by the wider, shallower shoal region at the mouth of the river. EPA has documented that modeling based on almost two decades of historical monitoring data show a consistent pattern of summer severe hypoxic to anoxic conditions, and model simulated improvements in dissolved oxygen concentration did not yield full attainment of dissolved oxygen criteria. EPA has indicated that this portion of the Chester River is not expected to recover to the point that it meets the dissolved oxygen criteria for the deep-channel as established in the *Regional Criteria Document* due in great part to the natural constraints discussed above. Results from TMDL model calculations based on slightly larger nutrient loads than those used in 2010 TMDL indicate that the CHSMH restoration variance needs to be slight increased from 14 to 16% everything else the same notwithstanding.

The results of the same TMDL model calculations have lead to the realization that the EASMH section has similar natural constraints discussed above for CHSMH section. Shortnose sturgeon are likely to continue to be precluded from both of this areas. However, these areas are extremely small and represent an extremely small percentage of available deep water habitats within the Bay.

Additionally, the modification of the criteria in these segments does not affect DO levels in other areas of the Bay. As such, it does not change the predicted conditions Bay wide. The EPA concludes that there still be no changes to the conclusion reached by NMFS in its 2012 Opinion of Chesapeake Bay TMDL, referring to the lower Chester variance: "As such, any effects of the modification of this criterion on shortnose sturgeon will be insignificant and discountable." (NOAA NMFS Opinion 2012) In the case of the Atlantic sturgeon, which is less sensitive than the shortnose sturgeon to dissolved oxygen concentrations (NOAA NMFS Opinion 2012, p. 87), NMFS concluded in the letter transmitting the 2012 Biological Opinion "that the effects of the actions on Atlantic sturgeon will be similar to those considered for shortnose sturgeon." (January 30, 2012 letter from NOAA NMFS transmitting the 2012 Opinion). The EPA concludes that the finding for shortnose sturgeon in the 2012 Biological Opinion can be applied to the Atlantic sturgeon distinct population in the Chesapeake Bay.

ESA Determination

EPA finds that Maryland's adoption of new or revised regulations for water quality criteria may affect but are not likely to adversely affect listed species in Maryland. MDE has based their revisions on the most recent Federal recommendations for water quality standards.

References

ASMFC. 1998b. Atlantic sturgeon stock assessment. ASMFC Peer Review Report. ASMFC, Washington, D.C., March 1998.

Atlantic Sturgeon Status Review Team. 2007. Status Review of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). Report to National Marine Fisheries Service, Northeast Regional Office. February 23, 2007. 174 pp.

Beamesderfer, R. and R. Farr. 1997. Alternatives for the protection and restoration of sturgeons and their habitat. Environmental Biology of Fishes 48: 407-417.

Bushnoe, T. M., J. A. Musick, D. S. Ha. 2005 (Draft). Essential spawning and nursery habitat of Atlantic sturgeon (Acipenser oxyrinchus) in Virginia.

Chesapeake Bay Journal, October 2011

Dadswell, M. 1979. Biology and population characteristics of the shortnose sturgeon, Acipenser brevirostrum, LeSueur 1818 (Osteicbthyes: Acipenseridae) in the Saint John River estuary, New Brunswick, Canada. Canadian Journal of Zoology. 57:2186-2210.

Dadswell, M., et.al. 1984. Synopsis of biological data on shortnose sturgeon, Acipenser brevirostrum, LeSueur 1818. National Oceanic and Atmospheric Administration, Washington DC. 45pp.

Driscoll, C. 1995. Personal communication, Maryland Department of Natural Resources, Oxford, Maryland

Excerpts from Biological Opinion on Sea Turtles. National Marine Fisheries Services, Oxford, MD.

Mangold, M. 2003. Atlantic Sturgeon Reward Program Catch Data (unpublished), 1994-2003. U.S. Fish and Wildlife Service, Maryland Fisheries Resource Office, Annapolis Maryland.

Moser, Andy, 2008, Personal communication, U.S Fish and Wildlife Services, Annapolis Maryland

NOAA National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1991a. Recovery plan for U.S. population of Atlantic green turtle (Chelonia mydas). National Marine Fisheries Service, Washington D.C.

NOAA National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1991b. Recovery plan for U.S. population of loggerhead turtle (Caretta caretta). National Marine Fisheries Service, Washington D.C.

NOAA National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1992. Recovery plan for leatherback turtles (Dermochelys coriacea) in the U.S. Caribbean, Atlantic, and Gulf of Mexico. National Marine Fisheries Service, Washington D.C.

NOAA National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1993. Recovery plan for hawksbill turtles in the U.S. Caribbean Sea, Atlantic Ocean, and Gulf of Mexico. National Marine Fisheries Service, St. Petersburg, Florida.

NOAA National Marine Fisheries Service. 1991a. Recovery Plan for the northern right whale (Eubalaena glacialis). Prepared by the Right Whale Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. 86 pp.

NOAA National Marine Fisheries Service. 1991b. Recovery Plan for the humpback whale (Megaptera novaeangliae). Prepared by the Humpback Whale Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. 105 pp.

NOAA National Marine Fisheries Service. 1998a. Recovery plan for the shortnose sturgeon Acipenser brevirostrum). Prepared by the Shortnose Sturgeon Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland.

NOAA National Marine Fisheries Service. 1998b. Recovery plan for the blue whale (Balaenoptera musculus). Prepared by Reeves, R.R., P.J. Clapham, R.L. Brownell, Jr., and G.K. Silber for the National Marine Fisheries Service, Silver Spring, Maryland. 42 pp.

NOAA National Marine Fisheries Service. 1998c. Recovery plan for the fin whale (Balaenoptera physalus) and Sei Whale (Balaenoptera borealis). Prepared by Reeves, R.R., G.K. Silber, and P.M. Payne. National Marine Fisheries Service, Silver Spring, Maryland.

NOAA National Marine Fisheries Service. 1998d. Status review of Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus). NMFS, Gloucester, MA. 124 pp.

NOAA National Marine Fisheries Service. 2000. A protocol for use of shortnose and Atlantic sturgeons. NOAA Technical Memorandum. NMFS-OPR-18. Silver Spring, Maryland. 21 pp.

NOAA National Marine Fisheries Service. 2002. Final biological opinion for the national pollutant discharge elimination system permit for the Washington aqueduct. Gloucester, Massachusetts.

NOAA National Marine Fisheries Service. 2012. Final biological opinion: Environmental Protection Agency's (EPA) implementation of a program for attaining ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll *a* for the Chesapeake Bay and its tidal tributaries. Gloucester, Massachusetts

NOAA National Marine Fisheries Service. 2012. Endangered and Threatened Wildlife and Plants: Threatened and Endangered Status for Distinct Population Segmentsd of Atlantic Sturgeon in Northeast Region. Federal Register (77, 5880)

Secor, D.H., T. E. Gunderson. 1998. Effect of Hypoxia on survival, growth and respiration on juvinale Atlantic sturgeon, Acipenser oxyrinchus oxyrinchus, Fishery Bulletin 96:603-613

Secor, D.H., J. Niklitschek, J. T. Stevenson, T. E. Gunderson, S. P. Minkkinen, B. Richardson, B. Florence, M.. Mangold, J. Skjeveland, A. Henderson-Arzapalo. Dispersal and growth of yearling Atlantic sturgeon, Acipenser oxyrinchus oxyrinchus, released into Chesapeake Bay. Fishery Bulletin 98:800-810

Secor, D.H. and E. J. Niklitschek. 2001. Hypoxia and Sturgeons: Report to the Chesapeake Bay Program Dissolved Oxygen Criteria Team. University of Maryland Center for Environmental Studies, Chesapeake Biological Laboratory. Technical Report Series No. TS-314-01-CBL.

U.S. Environmental Protection Agency 2003a. Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and Its Tidal Tributaries. EPA 903-R-03-002. Chesapeake Bay Program Office, Annapolis, Maryland.

U.S. Environmental Protection Agency, 2010. Addendum to EPA's Biological Evaluation for the Issuance of Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and Its Tidal Tributaries

U.S. Fish and Wildlife Service, and U.S. Department of Commerce, NOAA, 1992. Recovery Plan for the Kemp's Ridley Sea Turtle. U.S. Fish and Wildlife Service and National Marine Fisheries Service, Washington, D.C. 40pp.

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Appendices:

A. State of Maryland Water Quality Standards 2010 Proposed New and Revised Items with EPA Action

B. Federally Listed and Proposed Endangered and Threatened Species in Maryland, http://ecos.fws.gov/tess_public//pub/stateListing.jsp?state=MD&status=listed

C. Marine Mammal Species under Endangered Species Act, http://www.nmfs.noaa.gov/pr/species/esa/mammals.htm

Appendix A – State of Maryland Water Quality Standards 2010 Proposed New and Revised Items with EPA Action

State of Maryland Water Quality Standards 2010 Proposed New and Revised Items with EPA Action

Section Approved	Description of Revision	EPA Proposed Action and Rationale
COMAR 26.08.02.03-3C (8)(f)(iii) Criteria for Use II Waters	Move/Recodify the restoration variance for Lower Chester River Mesohaline (CHSMH)	Approval. The revision moves/relocates this segment from COMAR 26.08.02.03-3C (8)(e)(vii) to proper location COMAR 26.08.02.03-3C (8)(f)(iii) Criteria for Use II Waters, since it refers to the seasonal deep-channel refuge subcategory
COMAR 26.08.02.03-3C (8)(f)(iii) Criteria for Use II Waters	Modify the dissolved oxygen restoration variance for Lower Chester River Mesohaline (CHSMH) allowing excursion from applicable DO criterion 16% instead of only 14% spatially and temporally	Approval. Monitoring, analysis and modeling in 2011 by CBPO for 2010 Chesapeake Bay TMDL identified the need for this variance which meets the requirement of EPA regulations at 40 CFR 13110, 131.11 and 131.13 and as noted in COMAR 16.08.02.03-3C (8) (g) and (h)
COMAR 26.08.02.03-3C (8)(f)(iv) Criteria for Use II Waters	New dissolved oxygen restoration variance for Eastern Bay Mesohaline (EASMH) section, allowing excursion from the applicable DO criterion 2% spatially and temporally	Approval. Monitoring, analysis and modeling by in 2011 by CBPO for 2010 Chesapeake Bay TMDL identified the need for this variance which meets the requirement of EPA regulations at 40 CFR 13110, 131.11 and 131.13 and as noted in COMAR 16.08.02.03-3C (8) (g) and (h)

Appendix B – Federally Listed and Proposed Endangered and Threatened Species in Maryland

U.S. Fish & Wildlife Service
Threatened & Endangered Species System
Maryland

Notes:
This report shows the species listed in this state according to the Federal Register listing description.
This list does not include experimental populations and similarity of appearance listings.
This list includes species or populations under the sole jurisdiction of the National Marine Fisheries Service.
Click on the highlighted scientific names below to view a Species Profile for each listing.

Listed species (based on published population data) -- 31 listings

Animals – 21

Status	Species/Listing Name
E	Bat, Indiana (Myotis sodalis)
E	Beetle, American burying (Nicrophorus americanus)
E	Curlew, Eskimo (Numenius borealis)
E	Darter, Maryland (Etheostoma sellare)
T	Plover, piping except Great Lakes watershed (Charadrius melodus)
E	Puma (=cougar), eastern (Puma (=Felis) concolor couguar)
T	Sea turtle, green except where endangered (Chelonia mydas)
E	Sea turtle, hawksbill (Eretmochelys imbricata)
E	Sea turtle, Kemp's ridley (Lepidochelys kempii)
E	Sea turtle, leatherback (Dermochelys coriacea)
T	Sea turtle, loggerhead (Caretta caretta)
E	Squirrel, Delmarva Peninsula fox Entire, except Sussex Co., DE (Sciurus niger cinereus)
E	Sturgeon, shortnose (Acipenser brevirostrum)
T	Tiger beetle, northeastern beach (Cicindela dorsalis dorsalis)
T	Tiger beetle, Puritan (Cicindela puritana)

T	Turtle, bog (=Muhlenberg) northern (Clemmys muhlenbergii)
E	Wedgemussel, dwarf (Alasmidonta heterodon)
E	Whale, finback (Balaenoptera physalus)
E	Whale, humpback (Megaptera novaeangliae)
E	Whale, right (Balaena glacialis (incl. australis))
E	Wolf, gray Lower 48 States, except where delisted and where EXPN. Mexico. (Canis lupus)

Plants – 10

Status	Species/Listing Name
T	Amaranth, seabeach (Amaranthus pumilus)
E	Bulrush, Northeastern (Scirpus ancistrochaetus)
E	Chaffseed, American (Schwalbea americana)
E	Coneflower, smooth (Echinacea laevigata)
E	Dropwort, Canby's (Oxypolis canbyi)
E	Gerardia, sandplain (Agalinis acuta)
E	Harperella (Ptilimnium nodosum)
T	Joint-vetch, sensitive (Aeschynomene virginica)
T	Pink, swamp (Helonias bullata)
T	Pogonia, small whorled (Isotria medeoloides)

Appendix C - Marine Mammal Species under Endangered Species Act

Marine Mammal Species Under the Endangered Species Act (ESA)

List of Mammal Species under NMFS' Jurisdiction

(E = "endangered"; T = "threatened"; F = "foreign"; n/a = not applicable*)

Marine Mammals (22 listed "species")

Manatees and sea otters are also listed under the ESA, but fall under the jurisdiction of the U.S. Fish and Wildlife Service.

Species	Year Listed	Status	Critical Habitat*	Recovery Plan*
Cetaceans				
beluga whale (1 listed DPS) (*Delphinapterus leucas*)				
○ Cook Inlet	2008	E	final	in process
blue whale (*Balaenoptera musculus*)	1970	E	n/a	final
bowhead whale (*Balaena mysticetus*)	1970	E	n/a	n/a
Chinese River dolphin / baiji (*Lipotes vexillifer*)	1989	E (F)	n/a	n/a
fin whale (*Balaenoptera physalus*)	1970	E	n/a	final
gray whale (1 listed DPS) (*Eschrichtius robustus*)				
○ Western North Pacific	1970	E (F)	n/a	n/a
Gulf of California harbor porpoise / vaquita (*Phocoena sinus*)	1985	E (F)	n/a	n/a
humpback whale (*Megaptera novaeangliae*)	1970	E	n/a	final
Indus River dolphin (*Platanista minor*)	1991	E (F)	n/a	n/a
killer whale (1 listed DPS) (*Orcinus orca*)				
○ Southern Resident	2005	E	final	final
North Atlantic right whale	2008	E	final	final

(*Eubalaena glacialis*)				
original listing as "northern right whale" -	1970	E		
North Pacific right whale (*Eubalaena japonica*)	2008	E	final	no
original listing as "northern right whale" -	1970	E		
sei whale (*Balaenoptera borealis*)	1970	E	n/a	final
Southern right whale (*Eubalaena australis*)	1970	E (F)	n/a	n/a
sperm whale (*Physeter macrocephalus*)	1970	E	n/a	final
Pinnipeds				
Guadalupe fur seal (*Arctocephalus townsendi*)	1985	T (F)	n/a	n/a
Hawaiian monk seal (*Monachus schauinslandi)*	1976	E	final	final
Mediterranean monk seal (*Monachus monachus)*	1970	E (F)	n/a	n/a
Saimaa seal (*Phoca hispida saimensis*)	1993	E (F)	n/a	n/a
Spotted seal (1 listed DPS) *(Phoca largha)*				
○ Southern	2010	T	no	no
Steller sea lion (2 listed DPSs) (*Eumetopias jubatus*)				
○ Eastern *NMFS has proposed to delist the eastern DPS.	1990	T	final	final
○ Western	1997	E	final	final
original listing -	1990	T		